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Continued Developments in the Modeling of Complex Dimension and Orientation Variation in Split D Differential Eddy Current Probes

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Over the past few years, the complexity of models for split D differential eddy current probes has increased significantly. Moving from rather simplistic models where coils and cores were modeled symmetrically to the current state where validation can be done using very asymmetric coils [1, 2, 3]. Last year results showing a large amount of modeling error for variation in the orientation of the various components of a split D probe were presented. As a follow-on to this effort, additional modeling work has been performed looking into alleviating this error. One of the major factors being investigated this year is increasing mesh resolution. Convergence and statistical analysis will be performed on the data to determine the appropriate mesh resolution necessary for future modeling efforts involving orientation variation is needed. Recent work has addressed a model validation study using a large split D probe scanned over a notch at various orientations. Data from the previously described simulations will be compared to the experimental data collected. By running the simulations at various mesh resolutions, it is anticipated that a pattern will emerge detailing how the mesh resolution needs to changes to achieve comparable levels of accuracy as the probe orientation varies.

References:

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3. R. D. Mooers, J. C. Aldrin, and J. S. Knopp, “Model the Effects of Core/Coil Size and Defect Length on Eddy Current Response,” *Review of Progress in QNDE*, edited by D.E. Chimenti and L. J. Bond, Volume 34, (AIP,2015), Vol. 1650, pp. 395-404.